

REMARKS

In the Office Action, the drawings have been objected to under 37 CFR §1.83(a) for failing to show every feature of the invention specified in the claims. Corresponding to these drawing objections, the Examiner has also objected to claims 1, 2, 14 and 18 for containing claim elements that are not illustrated in the drawings or described in the specification. Additionally, claims 1-20 have been rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention, and as failing to comply with the written description requirement.

Also in the Office Action, claims 1-20 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Moreover, claims 1, 14, 16, 18 and 20 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Cheng et al. 6,577,421. Further, claims 15, 17 and 19 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheng et al. 6,577,421 in view of Ouderkirk et al. 6,181,474 or Yang et al. 5,848,211.

In this Response to Office Action, claims 1 and 14-20 are hereby cancelled without prejudice or disclaimer of subject matter. In addition, independent claim 2 has been amended to now recite an adjustable MEMS mirror, an optical position detector configured to generate an error signal indicative of a spatial relationship of a reference beam incident point and a target of the detector, and a closed loop servo control system for moving the mirror in response to the error signal to nullify the error signal. Also, Fig.

15 has been amended to show the servo control system and its operative connections to both the optical position detector and the mirror. Accordingly, the specification has been amended to reference the feature added to Fig. 15. Support for these amendments is found in the specification beginning on page 7, lines 8-12 of the preliminary amendment dated December 3, 2002, and in the specification beginning on page 18 at line 3 of the preliminary amendment dated December 3, 2002 and continuing to page 19 at line 3.

Amendments to the claims have been presented herein to improve the readability of the claims and to point out the features which distinguish the present invention over the cited art. Also, these amendments have been made to more clearly define the structure and cooperation of structure for the present invention. Claims 2-13 remain pending.

Objections to the Drawings and Claims

In the Office Action, the drawings have been objected to under 37 CFR §1.83(a) for failing to show every feature of the invention specified in the claims, and as a consequence, claims 1, 2, 14 and 18 have been objected to for containing claim elements that are not illustrated in the drawings or described in the specification. Specifically, the objected claim elements are: the MEMS mirror adjuster in claim 1, the comparator in claim 2, the means for producing an error signal and means for adjusting in claim 14, and the term "producing an error signal and directing the reference light beam" in claim 18.

As indicated above, claims 1, 14 and 18 have been cancelled. In addition, claim

2 has been amended to delete reference to the term "comparator". As indicated above, claim 2 has been amended to now recite an optical position detector configured to generate an error signal indicative of a spatial relationship of a reference beam incident point and a target of the detector. This element is clearly shown in Figs. 13 and 15 and described in the specification beginning on page 18 at line 3 of the preliminary amendment dated December 3, 2002 and continuing to page 19 at line 3.

With these amendments and claim cancellations, Attorney for Applicant respectfully contends that the basis for objecting to the drawings and claims has been overcome and the objections should be withdrawn.

Rejections under 35 U.S.C. § 112

In the Office Action, all claims (i.e. claims 1-20) have been rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention, and as failing to comply with the written description requirement. Also, claims 1-20 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

As indicated above, claims 1 and 14-20 have been cancelled. With regard to pending claims 2-13, the Examiner has indicated that "Applicants have not provided sufficient teaching so as to demonstrate how the claimed comparator or its analogous equivalent, if ever disclosed, generates an error signal so that a control system can respond to such error signal to nullify said error signal so as to enable one of ordinary

skilled in the art to practice, use or make the invention.” Also, the Examiner has indicated that “Applicants fail to describe how the error signal is transmitted or utilized to and by the control system so as to nullify said error signal for an artisan to carry out such invention.” In addition, the Examiner has stated that the term “a comparator for generating an error signal indicative of a spatial relationship of the incident point on said detector” is not supported by the specification as originally filed.

In this Response to Office Action, claim 2 has been amended to delete all reference to the term “comparator”. As amended, independent claim 2 now recites a system for directing a communications light beam from free-space that includes a reference light beam source, an optical fiber, and an optical position detector having a target. The system further includes an adjustable MEMS mirror for directing the communications light beam toward an end of the optical fiber, and for directing the reference light beam to an incident point on the detector. It is further recited that the optical position detector is configured to generate an error signal indicative of a spatial relationship of the incident point on the detector to the target of the detector. Finally, claim 2 also requires a closed-loop servo control system for moving the mirror in response to the error signal to nullify the error signal to direct the communications light beam to a predetermined point on the end of the optical fiber.

Attorney for Applicant respectfully contends the written description requirement of 35 U.S.C. § 112, first paragraph is satisfied for claim 2, as amended, and that the amended claim 2 is no longer indefinite. It is further asserted herein that the invention as now claimed in amended claim 2 is described in the specification in such a way as to enable one skilled in the pertinent art to make and use the invention. In particular,

Attorney for Applicant respectfully contends that the interactive cooperation between the optical position detector, the closed loop servo control system and the adjustable MEMS mirror is described in sufficient detail in the specification of the above-captioned application, as filed, to allow the skilled artisan to make and use the invention without undue experimentation.

Beginning with the optical position detector, the specification clearly discloses an optical position detector 72, which includes a Silicone diode with several outputs. It is further disclosed that the electrical signals outputted from the detector 72 are sensitive to the intensity of an optical signal in a received servo light beam 64b and to the exact location of the optical signal on the detector 72. The specification also states that if there is an error in aiming, the electrical signal outputted from the detector 72 indicates the direction and magnitude of the error. (See, for example, page 18, line 18 to page 19, line 3 of the preliminary amendment dated December 3, 2002). It is submitted that such an optical position detector, which has multiple outputs and generates electrical signals indicative of position error, could be readily constructed (or purchased) by those skilled in the pertinent art as of the filing date of the above-captioned application.

With regard to the adjustable MEMS mirror, the specification shows and describes a MEMS mirror and corresponding package having the ability to independently tilt the mirror about two orthogonal axes. Importantly, the specification directs those skilled in the pertinent art to EP 962796 A2 for a detailed description of an adjustable MEMS mirror suitable for use in the invention. This document, EP 962796A2, which was readily available as of the filing date of the above-captioned application, clearly describes in detail a two axis MEMS mirror which can be selectively

adjusted to independently rotate the MEMS mirror about each axis in response to a specific voltage input.

Lastly, the specification describes a closed-loop servo control system. This closed-loop servo control system receives the electrical signals (indicative of beam position) from the optical position detector, and in turn, generates the MEMS mirror voltage inputs (to correctly adjust the MEMS mirror). Although conductive wires are not specifically mentioned in the disclosure, it is well known that wires can be used to transfer electrical signals from one electrical component to another (i.e. from the optical position detector to the closed-loop servo control system and from the servo control system to the MEMS mirror). The selection of a specific structure for the closed-loop servo control system (e.g. processor, ASIC, logic circuit, etc.) is well within the grasp of the skilled artisan for this art and can include any device capable of following a pre-programmed calibration table to generate an appropriate MEMS mirror voltage input upon the receipt of a specific electrical signal from the optical position detector.

With the above in mind, Attorney for Applicant respectfully contends that the specification, as filed, describes the invention, as now claimed in amended claim 2, in such a way as to enable one skilled in the pertinent art to make and use the invention.

Accordingly, Attorney for Applicant respectfully contends that the basis for the rejections under 35 U.S.C. § 112 has been overcome and that the rejections should be withdrawn.

Rejections under 35 U.S.C. § 102(b)

In the Office Action, claims 1, 14, 16, 18 and 20 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Cheng et al. 6,577,421.

As indicated above, claims 1 and 14-20 have been cancelled. With these claim cancellations, Applicant believes that the basis for rejecting claims under 35 U.S.C. § 102(e) has been overcome and the rejections should be withdrawn.

Rejections under 35 U.S.C. § 103(a)

In the Office Action, claims 15, 17 and 19 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheng et al. 6,577,421 in view of Ouderkirk et al. 6,181,474 or Yang et al. 5,848,211.

As indicated above, claims 1 and 14-20 have been cancelled. With these claim cancellations, Applicant believes that the basis for rejecting claims under 35 U.S.C. § 103(a) has been overcome and the rejections should be withdrawn.

The references cited by the Examiner, but not relied on for the rejection of claims, have been noted.

In conclusion, Applicant respectfully asserts that claims 2-13 are patentable for the reasons set forth above, and that the application is now in a condition for allowance. Accordingly, an early notice of allowance is respectfully requested. The Examiner is requested to call the undersigned at 619-688-1300 for any reason that would advance the instant application to issue.

Dated this 21st day of July, 2004.

Respectfully submitted,



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